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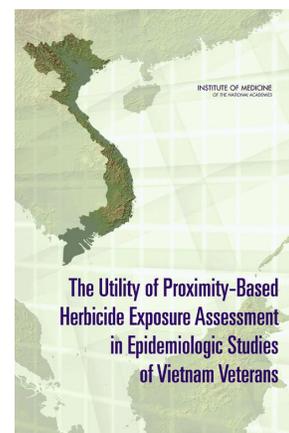
REPORT BRIEF • MARCH 2008

THE UTILITY OF PROXIMITY-BASED HERBICIDE EXPOSURE ASSESSMENT IN EPIDEMIOLOGIC STUDIES OF VIETNAM VETERANS

For decades questions have lingered about whether Vietnam veterans have suffered health effects from wartime exposure to Agent Orange and other herbicides, some of which were contaminated by 2,3,7,8-tetrachlorodibenzo-*p*-dioxin, or TCDD. One of the main stumbling blocks to answering these questions has been the lack of an effective means for assessing individual exposure levels. As a result, it has proved exceptionally difficult to determine whether there is a clear correlation between exposure to the herbicides and the health effects that various veterans have experienced.

In 2003, however, researchers published a herbicide exposure assessment model. Working from historical records on when and where herbicides were applied, their model calculates two different measures of “exposure opportunity” when information is supplied on when and where veterans served in Vietnam during the years that the herbicides were used. In response, the Department of Veterans Affairs (VA) requested that the Institute of Medicine appoint a committee to provide advice on the best ways to put the model to use in investigating the effects of herbicide exposure on the long-term health of Vietnam veterans. The committee has now released its report, *The Utility of Proximity-Based Herbicide Exposure Assessment in Epidemiologic Studies of Vietnam Veterans*.

The exposure assessment model, which was developed by Dr. Jeanne Mager Stellman and colleagues, is based on a geographic information system that stores details about much of the herbicide use by U.S. forces in the Vietnam War, including when and where the herbicides were sprayed and how much and what types of herbicides were used in each case. Those who would like to use the model supply information about where individuals or military units were at different points in time, and the model compares these location histories with what is known about when and where herbicides were applied. The resulting output consists of two measures of exposure opportunity. The first is a “hits” metric, which essentially counts up how often an individual or unit was located within certain distances of a spray path at the time a herbicide was being applied. The second is the Exposure Opportunity Index, which takes indirect exposures into account as well. Since a herbicide would have lingered in an area after it was applied, this measure considers the “half-life” of the herbicide to develop an estimate of exposure opportunity that includes the residual herbicide left over from applications made before an individual or unit came into an area.



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located during the war. As such, although the model is still a relatively crude way of assessing exposure, the committee concluded that it offers a clear improvement over the methods of assessing exposure used in many previous studies. In an ideal world, studies would be based on assessments from levels three, four, or five of the hierarchy, but the committee noted that environmental epidemiology often advances through successive approximations of exposure, and so the utility of a model is defined in part by the methods it improves upon.

With that in mind, the committee advised the VA that the model should be used to study whether being near herbicide spraying is associated with health problems in Vietnam veterans. The committee also made several recommendations for researchers interested in using the model to assess the health effects of herbicides on Vietnam veterans. One of the major challenges facing these researchers will be assembling the necessary data. The model's developers have done the work of collecting and assembling the data on when and where herbicides were applied, but anyone who wishes to use the model must input information on when and where military personnel served in Vietnam along with details about their health outcomes.

Assembling such information on former military personnel will be difficult but should be a feasible task, the committee concluded. The Stellman group has already collected location data for most of the military units in Vietnam that were relatively stable—i.e., that stayed mainly in one place—as well as for some of the combat units that moved around. A further step will be to identify the individuals who served in these various units and get access to their service records.

Researchers will also need to accumulate health data for the veterans. Mortality data are relatively straightforward to collect, but data on the incidence of disease are more difficult to assemble, as there is no single source of such data. Although the VA has data on those veterans who use its healthcare system, only about 20 percent of Vietnam veterans do. One emerging option is that as more veterans reach the age of 65 and become eligible for Medicare, researchers will be able to use Medicare records to conduct their studies of veterans' health.

Getting permission to access military records and then assembling data on individuals who served in Vietnam will be challenging, the committee said, particularly for researchers who are not affiliated with the Department of Defense (DOD) or the VA. Still, the committee noted that it will be important for the research to be performed more broadly than simply inside the VA and the DOD, and it urged outside researchers who are interested in these studies to pursue them in collaboration with those with better access to records and with the assistance of experts in the location and interpretation of Vietnam-era military records.

The committee warned that when researchers do apply the Stellman model to study the health effects of Agent Orange and other herbicides on Vietnam veterans, caution should be used in interpreting the results. If studies do find connections between being near spraying and various health outcomes, it will be an important step in understanding this issue. However, no single study can be definitive, and the results will need to be reproduced and considered in combination with other work. If, on the other hand, studies find no connections, these results will be more difficult to interpret. It might be the case, for example, that the Stellman model does not offer a sensitive enough assessment of exposure for the studies to see a connection that does indeed exist, or it might be that the connection does not exist. Despite these cautions, the committee concluded that the exposure assessment model offers an opportunity to study the health of Vietnam veterans that should be pursued.

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FOR MORE INFORMATION . . .

Copies of *The Utility of Proximity-Based Herbicide Exposure Assessment in Epidemiologic Studies of Vietnam Veterans* are available from the National Academies Press, 500 Fifth Street, N.W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area); Internet, www.nap.edu. The full text of this report is available at www.nap.edu.

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COMMITTEE ON MAKING BEST USE OF THE AGENT ORANGE EXPOSURE RECONSTRUCTION MODEL

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